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Latest quotation of centrifugal sugar in New York was 4¼c. for centrifugals—same as previous quotation.

In our spot market, says Czarnikow's New York circular of June 14, the price of centrifugals has been maintained at 4¼c., but the business done in the lower grades has been at the expense of values, sales of muscovados having been made at 3⅝c. and of molasses sugars at 3⅜c. Even at the decline these grades are not wanted, as refiners are overstocked with them, and for the time being it is quite impossible to sell either muscovados or molasses sugars, unless the quantity is small and forms part of a lot mainly composed of centrifugals.

There have been moderate offerings of sugars for shipment, and early in the week some sales of Cuba centrifugals were made at 2 17-32c., c. and f., basis 95°. A small quantity of Cuba sugars afloat was also sold, the centrifugals at 2 9-16c., basis 96°, c. i. f., and the molasses sugars at 1 15-16c., basis 89°, c. i. f.

A Java steamer recently cleared is in the market at slightly under the parity of the Cuba offerings.

As beet sugars at the decline are still a shade over the parity of centrifugals at 4¼c., there is no inducement to our refiners to operate in European markets and if beets do not have a further decline there is no reason for prices here going lower. At the moment there is a general disinclination on the part of buyers to operate further until refined sugar begins to move more freely.

The week's receipts have been very heavy, amounting to 64,600 tons, and as meltings were only 38,000 tons, stocks are increased 26,600 tons and are now 263,400 tons. The receipts included 15,500 tons from Cuba, 13,400 tons from other West Indian Islands, 5,600 tons from Brazil, 7,000 tons from Java (the two cargoes mentioned in our last as having arrived

at port of call), 4,150 tons from Egypt, 4,600 tons from the Sandwich Islands and 10,400 tons from Europe. The Egyptian cargo is the first arrival of this season's crop.

CORRECTION.—In the article on "Rational Manuring," on page 157 of the Planters' Monthly for April, 1901, the figures given should have read "43.560 cubic feet," instead of those that were printed.

COFFEE.—It is patent to every one who follows the market now, that the current 1901 crop promises to break all records. The estimates of the next 1901-1902 crop point to a crop of 11,000,000 to 12,000,000 bags of Rio and Santos together.

Organized labor forced the organization of capitalists. Both organizations need to work in harmony, and for either to ignore the other means an unjustifiable industrial war.

During a trial in Paris between two partners of an important corset firm, the debate revealed that one of the principal branches of their manufactures was men's corsets. The Judge having demanded an explanation, it was sworn that more than 18,000 corsets were made yearly for Frenchmen and 3,000 were shipped to England, principally for army officers. German officers created also quite a demand till a rival Berlin firm offered a cheaper article.

IRRIGATION RULES.—1—The more cultivation, the less water is required. 2—Irrigation furrows should generally not be over three inches deep. 3—Do not let the water lie around the stems of plants. 4—Do not over-irrigate; two thorough soakings a month are usually sufficient. 5—Do not water trees or vines when in blossom, nor until the fruit has properly set. 6—Irrigate preferably on cloudy days or at night. 7—Do not apply water when the soil is hot.

Liberty has not lost, but gained in strength. The structure of the fathers stands secure upon the foundations on which they raised it, and is today, as it has been in the years past, and as it will be in the years to come, the "government of the people, by the people, and for the people." Be not disturbed; there is no danger from empire; there is no fear for the Republic.—Pres. McKinley.

A new process for branding stock in New Zealand, is said to be proving satisfactory in that Colony. It consists in the application on a wooden brand of a caustic which obliterates the hair without injuring the skin. It is stated that the cost of branding 100 cattle only amounts to 15s., which is fully compensated for by the sound skins put on the market. As cattle must be marked in some legible and indelible way, any method which may supercede the hot branding iron will prove of great advantage.

Milk Adulteration in Germany.—Consul-General Guenther, of Frankfort, February 11, 1901, writes that, according to the report of the Heilbronn board of health, of 122 samples of milk examined 67 proved to be adulterated with 20 to 120 per cent of water. A test of 3,794 samples of milk, made in Hamburg in 1900, resulted in proving 12 per cent. objectionable; 25 per cent. of this on account of addition of water. Fifty per cent. of the cans were objected to. A member of the board of health has prepared statistics showing that 8 per cent. of the children born in that city die in consequence of malnutrition.

About thirty-five years ago, a French mathematician, Demoivre, gave the following rule for calculating the age to which the average human being may reasonably expect to attain. The rule, however, is not applicable to children under twelve, and it will not work with persons over eighty. Subtract your present age from eighty-six, divide the remainder by two, and the result will give you about the same number of years as the tables of mortality used by the life assurance companies.

Big Sugar Imports.—Assistant Appraiser Michael Nathan of the sugar division at the Appraiser's Stores reported yesterday that the receipts of sugar at the port of New York for the month ending April 30 amounted to over $9,000,000, representing a duty value to the government of over $6,000,000. This, Appraiser Nathan stated, was the largest amount of sugar imported for any one month in the history of the customs service of the port of New York.—Journal of Commerce, June 1.

The Louisiana sugar crop is being rapidly sent to market. The total outturn is estimated at 295,000 tons.

INFLUENCE OF EUROPEAN SUGAR ON THE AMERICAN MARKET PRICE.

There can be no question that European beet sugar is now the controling factor that regulates the market price of refined and consequently of all sugars. There is a steady increase in the production of beet sugar, which probably averages about 500,000 tons increase annually. At the same time there is a corresponding increase in the world's consumption of it, as is shown in the fact that the amount carried forward from year to year is not materially increased. Of late these importations have increased. The American refineries reduced the prices of some of their grades, supplying the importers at special rates; said to be below what other local customers obtained their supplies at. This has created a temporary disturbance in the wholesale trade. It is now reported, says the Journal of Commerce, that the importers will bring in sugars much more freely, and a severe struggle is expected. This threat of increased foreign competition is, it is understood, responsible for the absence of an advance in refined sugars by the local refiners. Such an advance had been quite generally expected for the reason that the sugar trust was credited with purchasing raw supplies at an advance in prices, and on the strength of this brokers who had discretionary orders on hand from their customers executed their orders. The advance, however, did not take place—a fact which is now explained by the disagreement between the importers and the sugar trust.

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A GREAT BONANZA.

The recent discovery of coal oil in Texas and Louisiana will unquestionably prove of great advantage, not only to the sugar industry of those States, but to other local industries. Its discovery appears to have been purely accidental, first made in Texas, where it was soon found that deposits or reservoirs, perhaps, existed in various sections of the state from which the crude oil could be obtained, as is now done in California and elsewhere. Experiments by boring have proved that similar deposits exist in Louisiana, which will no doubt give an impetus to the sugar industry in its manufacturing stage, as well as to other industries. Coal oil deposits

will be to Texas and Louisiana what the artesian water developments have been to the Hawaiian group, a source of industrial activity, expansion and wealth which could never have been deemed possible before the discovery. The time may not be far distant when the whole tier of gulf states from Florida westward to New Mexico and Arizona may share in the bountiful supply of fuel given to provide for peopling an apparently uninhabitable waste with an industrious population which otherwise could never have been the case, in those elevated plains. It is stated that among the fortunate land owners of Texas, ex-Governor Hogg, who owned a tract of land which has proved to be a rich oil deposit field, has sold his estate for $3,000,000.

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THE PRESIDENT'S VISIT TO THE PACIFIC.

The recent tour of President McKinley from the tide waters of the Atlantic to the shores of the Pacific is, we think, the first that has ever been made by a president of the United States during his term of office, and the first in which such a loyal popular demonstration—irrespective of party—has been shown, from the start to the finish. This has arisen from no sudden impulse of popular enthusiasm, but from an intense feeling of admiration for him as a man—the head and representative of the most progressive nation the world has ever seen—foremost perhaps not in numbers, but in all that goes to make a powerful but peaceful factor in the world's great drama. Although a Republican in politics, and pledged to maintain republican principles, he has conducted his administration in such fairness as to receive the approval of many of the opposite party on the leading questions of the day. As a writer well expresses it,—"the circumstances surrounding his Administration have been of the most difficult character; but it may be doubted if any one of his predecessors has made fewer mistakes, and it is certain that no one has made fewer excuses. Of what is done, he takes the responsibility, and has apparently no need for scapegoats. Through it all he has remained plain William McKinley, accessible to all, fearless of ridicule or denunciation, desirous only of promoting the best interests of the American people, whether they dwell within the ancient boundaries or in the islands of the sea over which our banner newly floats. As a man, as a patriot, as an administrator of public affairs, as a party leader, William McKinley

is one whom every American may proudly and safely emulate, no matter what his political opinions may be. More than any other President, except Abraham Lincoln, he has left his mark on the nation's future—a mark which no accident of political destiny can ever efface."

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AGRICULTURE AND FORESTRY IN HAWAII.

[The following extracts are from the biennial report of the Commissioner of Agriculture and Forestry, a pamphlet of 66 pages.]

The United States Department of Agriculture at Washington has been extremely thoughtful of this department in sending seeds, plants, etc., for general distribution among the islands. At various times we have received large consignments of different varieties of sorghum, white lupin, Egyptian Cotton, cowpea, jute, Daikon radish, muskmelon, etc. There was a large demand for the seeds and they were given away to those whom we know would plant them and give them careful attention, and further, report on them.

In September, I received a letter from Dr. Stubbs in which he stated he had made his report to the President and Secretary recommending that an Experiment Station be located on the plat assigned by the Board of Agriculture in 1893 as a site for an Experiment Station. This tract containing about 222 acres, starts from behind Honolulu running up the Makiki Valley to an elevation of over a thousand feet. It is known as Kewalo-uka. The Doctor further stated he had recommended a Director be appointed. That done, he would take charge at once; clear the grounds, erect the buildings and get ready for the remainder of his staff.

King Street Government Nursery.—Considerable improvement has been made at the Government Nursery on King street. It is from here that the distribution of plants, palms, shade and wind break trees is made to the general public, and for the beautifying of the Government School grounds. That this free distribution is a boon to the community is shown by the number distributed. By first obtaining an order from the office, the bearer is entitled to one, two, three, or more dozen of selected plants on condition that they are planted and well taken care of. A large number of new building lots have been opened out during the year, in and around

Honolulu, and the Government, through its Nursery, has been able to assist people in beautifying them with trees and plants which are most suited to this tropical clime. Plants and trees have also been sent to the other islands. During the year 24,544 trees have been distributed. In addition to the above number, 26,000 suitable forest trees have been propagated and sent up to the Nuuanu Forest Station and then planted out.

NUUANU FOREST.—This station situated in Nuuanu Valley about a mile below the famous Pali, is in charge of G. H. Moore, Forester, who has a working force of only five laborers. During the year they planted out 30,203 trees. Since the work of foresting the upper part of Nuuanu commenced the latter end of 1897, the number of trees planted out and cared for has been 109,960. But with only five men, the work has not progressed so fast as it should have done. I would recommend that a force of fifteen men be maintained at the station, and that additional quarters be built to accommodate them. Strict measures have had to be taken to prevent people trespassing on the lands and doing damage to the young trees, in some instances pulling them up and carrying them away. Notices have been posted in conspicuous places, and the trespassing has in consequence decreased.

MAKIKI FOREST STATION.—This forest is looked after by one man who lives all alone at the station. He has to keep the trails clean, to look out for fires and see that no damage is done to the trees which have been planted by the Government. There are a number of fruit trees he has to care for. Fortunately, during the year, there was only one fire started, and this was put out by the keeper before it could make any headway. Some necessary thinning out has been done which has its advantage. There has been a great increase in the travel up Tantalus forest, the name it is more generally known by. Tourists are delighted with the drive up Tantalus, the road is good, climate delightful, and the scenery unsurpassed. Several years ago when this station was established for foresting Tantalus, a cottage for the forester and quarters for the laborers were built. Upon investigation and looking over the survey, I was surprised to find that these buildings are on the Coney estate. However, by arrangement, our keeper is allowed to remain in his quarters, but I ask for an appropriation for building suitable quarters, and a shed, for him and an additional laborer on the Government land. The forest must be well looked after and I believe that can be

done better by two men than one. The list of trees growing in this forest is quite a lengthy one. None of them have as yet arrived at maturity, as regards the timber quality; it will be several years before they do that. Hundreds of exotic forest trees have been experimented with, and given a fair trial in the forest, but without success. Seeds have been received from the Southern States, Cape of Good Hope, Ceylon, Australian Colonies, China and Japan. The trees from Australia have proved to be the most successful. It has been suggested that more useful trees ought to have been planted in the forest. Those planted will all be useful when they arrive at maturity.

Application has been made to the United States Department of Agriculture. Division of Forestry, to send out an expert forester to investigate and make a report on the forests in this Territory. Anticipating the visit of this expert has somewhat interfered with my intention regarding forest work. I believe with Dr. Maxwell that "forest areas reserved with respect to location and maintained in a state of vigor and sound growth are of the first importance to the agriculture of the Territory. The greater number of the sugar plantations and all of the rice and banana fields are depending upon an elaborate and costly system of irrigation for their water supply, and the operation and availability of the irrigating waters are largely depending upon the area and state of the forests upon the mountain altitudes. It is not only claimed that cool forest covers cause precipitation of rain, but that the thick undergrowth and brush assist in conserving the water and in preventing its precipitous discharge to the sea, which conditions are indispensable in maintaining a regular supply of water for distribution over lower lands. Efforts have been made to restore the forest where it has been killed out. Several of these individual efforts have not only resulted in great benefit to the localities where the experiments have been made, but they are serving as object lessons, showing the immediate need of inclosing given forest areas and defending them against the action of cattle, thus following the depleted undergrowth and trees to come up again, a result which has followed in every case where inclosure has been adopted. Local efforts, however, do not meet the demands of the forest question from the standpoint of the interests of the Territory as a whole. What appears to be the most immediate needs are a thorough expert examination of the different islands and of

their requirements in permanent forest areas, an inspection of the existing forests, and the adoption of means for improvement and maintenance. It may be possible for such an expert survey to show that portions of lands still under forest could be cleared for cropping without prejudice to the immediate or to distant localities, and, on the other hand, to indicate that the disturbance of existing forest areas in given locations would result in detriment to agriculture all around. Because of its bearing upon the immediate and permanent interests of agriculture, there is no question which demands at once a more careful and expert investigation that the state of these Territorial forests."

This department has the care of Thomas and Emma squares, and is also to look after Makiki and River Parks when they are opened out. It is intended to make considerable improvement at Thomas square, and turn it into a public square; indeed, the work is already begun by the removal of every croton and hibiscus bush from the place. Some time ago the hibiscus hedge around the square was removed. The square is surrounded by a concrete sidewalk; between this and the curbstone grass will be planted.

Diversified Industries.—Encouraging reports come in from the American colony at Wahiawa, about twelve miles from Pearl City. They are settled on about fifteen hundred acres. There are fifty-three white residents in the colony. About four hundred acres have been plowed, part of it a second time. Something over fourteen hundred orange trees are planted in orchard, and several thousand more are on the ground ready to be planted. No less than 3,500 bananas are planted, and about 35,000 pines, with 20,000 more plants now in course of planting. In the orchard are 100 fig, 100 olive, 100 mango and pear, and 100 peach trees. Several thousand peach trees have been ordered from Florida, for which the ground is now being prepared.

I would call the attention of those who are interested in horticulture and agriculture, and urge on them to pay a visit to the country residence of Mr. S. M. Damon at Moanalua. This gentleman has spent thousands of dollars in improving his grounds and obtaining the rarest kinds of fruits and ornamental plants. A more magnificent collection of orchids could not be seen this side of the Rocky Mountains. The orchid house contains over three hundred different species,

more than can be seen in the Golden Gate Park conservatory, San Francisco. There is also a rose house and several greenhouses, where the work of propagating goes on, all under the direction of Mr. Donald McIntyre, who is always very courteous to visitors. Some of the finest varieties of mangoes are grown there, also a number of varieties of bananas and figs, papaias, avocado pears, etc. At the present time globe artichokes are being tried. Moanalua, in a measure, is an experimental garden, gradually, but surely drifting into what its owner at first contemplated, a botanical garden.

For a practical illustration of farming where attention is paid to every detail, mention must be made of the Waialae ranch, near Honolulu, and of which Mr. P. D. R. Isenberg is owner. He superintends everything himself, being deeply interested in agricultural matters. Here may be found growing finely in large quantities, many varieties of sorghum, alfalfa and other forage plants, besides grasses. No finer stock than that of Mr. Isenberg's is seen anywhere on the Islands.

EXTRACT FROM REPORT OF CHIEF FORESTER HAUGHS.

The following paragraph is from Mr. Haugh's report:

* * * In recommending the fencing and planting of portions of our mountain lands to be used as forest reservations, we may briefly consider what the forests may be expected to do for us in the future. First of all, let us consider the relation of forests to our water supply, and the reason for reserving such lands. It is a well known fact that forests restrain the destructive force of surface water, and thereby give it a better chance to soak into and saturate the adjacent earth. The downward pointing of roots of most trees, especially the larger ones, penetrate the earth to a great depth, and loosen the soil sufficiently to allow the water to find its way to the depths beneath, where it is safe from immediate evaporation, and where it continues possibly for months to fill the smaller streams and maintain the perpetual flow of our springs. The increased rapidity with which water drains out of a treeless country, carrying with it the best soil of our fields, which it is almost impossible to restore, is one of the most important

elements in agricultural prosperity. Just how great the volume of this fertile soil wash is, few persons have any idea of unless it in some way becomes conspicuous by its unusual amount, or by becoming a nuisance on our streets and roads. However, the greater and most fertile part of it is carried by the swift flow of the streams out to sea. The planting of trees for fuel where so much coal is at present being used, around the mills and pumps of our large plantations, is well worth the consideration of the agents and plantation managers.

REPORT OF PROFESSOR ALBERT KOEBELE, ENTOMOLOGIST.

Mr. Wray Taylor, Commissioner of Agriculture and Forestry. Sir—Having been absent from the Islands at the close of 1899 I herewith submit to you a report on work for the last two years:

In accordance with a letter of introduction from the Commissioner of Agriculture and Forestry, dated June 15, 1899, in company with Mr. George Compere, an agent of the State Board of Horticulture of California, I left for Australia and the Fiji Islands, partly to assist that gentleman, and to collect beneficial insects and plants for these Islands. On this last trip we sent a large amount of parasitic and predaceous insects from the various parts visited, and many of the same became permanently established on these Islands. * * *

From the Fiji Islands we sent two consignments of the most valuable little lady-bird, Anisorcus Affinis, Crotch, that is found upon all the citrus trees infested with Mytilaspis Citricola, Pack, in those Islands. In case of failure here we have sent the same insect also to Samoa to be more conveniently at hand in the future, together with a very large Aphid feeding species, Archaioneda Tricolor, Fabr., which as we have repeatedly observed, will entirely clean any large citrus tree of its Aphids within a few days. As previously reported, in 1894, I found this insect feeding upon Dactylopius on the Rewa river, Fiji.

From Australia many shipments of insects were made, and, in general, they arrived in good condition and were liberated. An additional small lady-bird, feeding upon the red spider

and several internal Chalcid parasites of the various Coccids, are of great importance.

A considerable amount of material was also forwarded from Hongkong; an internal parasite of Ceroplastes Rubens in its early stages; additional parasites of Pulvinaria Psidi, Mask, and fungoid disease upon same; parasites upon Dactylopius Vastator, and a large number of lady-birds deserve to be mentioned.

On April 10th of the present year I arrived in Honolulu. Trips to the various Islands have often been made, and reports upon observations handed to you. Much time has also been devoted to the investigation of the cane-borer, Sphenophorous Obscurus, and results reported to Hawaiian Planters' Association.

Fruit Maggot Flies.—Under this head come a considerable number of very destructive insects likely to appear in the Islands at any time, unless great vigilance is exercised to avoid any possible danger. So far, our too well known melon fly, Dacus Cucurbidae, Coq., is the only species present as far as known; and indeed, it is almost impossible to raise those fruits, or any of the allied forms without proper protection to the plants. In Mexico a similar fly is destructive to the oranges and sweet lemons. The Queensland fruit-maggot-fly, Tephritis Tryoni, Frogg., is long known in that country as one of the most serious orchard pests. Mr. Henry Tyron, in his admirable report, "Insects and Fungus Pests, 1899," already stated that with the exception of the grape, passion fruit and medlar, all fruits grown at the Toowomba district were affected by the fly. At the same locality during the end of December of last year we found nearly all the plums and prunes on the ground, a living mass of maggots.

Remedies.—Many so-called remedies have been tried and recommended, yet they are not worthy to repeat. With our melon-fly we can use only preventives, carefully select all the infected fruits and vines and burn or boil the same. This should be done very thoroughly every four or five days, so as not to allow any of the maggots to mature and escape to the ground to pupate.

Japanese Beetle.—During the past summer we have had letters showing that the Japanese beetle has now spread to all parts of the Islands. Owing to the dry season it became quite numerous in some localities during August and Sep-

tember, chiefly so, where it appeared for the first time. Large numbers of diseased beetles were sent out to spread the contagion with more or less good results. We shall be in position the coming season to raise this fungoid disease artificially and distribute in proper time to avoid any serious invasion of the same, in such localities, at least, where we have the required amount of rainfall.

Brother Newell of Hilo has kept up his good work in that district of raising and distributing diseased beetles, of which, between three and four hundred thousand specimens have been sent out up to September of the present year.

That valued flower, the rose, is seen more commonly in Honolulu, and it may again become as numerous as before. The beetle is not numerous during the months from November until May, and even June, but during the intervening months, if found necessary, the plants could be trimmed and strongly protected by netting. We have seen plants only surrounded with netting, some eighteen inches higher than plant and open above, hardly affected by the beetle.

Regarding silk culture, as an industry in the Hawaiian Islands, the professor says: The raising of silk worms had long since been attempted in the Hawaiian Islands, and the black-mulberry tree, Morus Nigra, originally introduced and cultivated for this purpose, has become naturalized in various parts of the Islands.

Some time since an attempt was made to revive this industry by importing large numbers of cuttings of the better varieties of mulberry trees. Various parties undertook to raise the worms in hopes of a possible paying industry. At the Government Nursery a few hundred of them were raised by experienced Japanese, who had done such work since childhood, and these proved to be the best cocoons that came under my observation on these Islands. These worms were fed upon leaves of a variety of mulberry growing at the nursery of which name I am not certain, likely Morus Alba, yet the leaves of those gave out and those of M. Nigra had to be substituted during the last two stages of their growth, doubtless interfering somewhat with their silk producing quality. It is known that this variety of tree is inferior as food of the worms to M. Alba, or the white mulberry; nevertheless, we estimated that from 950 to 1,000 choked cocoons

would be required to make one pound, less than a fair average.

A Swiss merchant with whom I recently traveled in the East, informed me, that in Italy, under agreement, but one annual brood of worms is raised, since the cocoons of the second brood are much inferior in quality. In Japan, according to the variety of broods, these vary from one to three. At Canton, China, as this gentleman informed me, seven broods of silk worms are raised annually. * * *

Under favorable conditions, it will take two persons about forty days to produce fifty pounds of choked cocoons that will sell, either in Southern France or Italy, at an average of one dollar per pound. As I have been informed by that Swiss silk merchant, the price of choked cocoons, at the beginning of the present year varied from 4 to 6 francs, 80 cents to $1.20 per pound in France and Italy.

As to the quality of the cocoons likely to be produced here, the letter of Dr. Howard, to whom we sent samples, will explain. "I have examined the silk worm cocoons with interest. Those from Hilo are very poor. They are thin and flimsy. The ones from the Government Nursery at Honolulu are better. Some of the pods are quite firm, but I should not call them first-class cocoons by any means. There is no market for cocoons in this country. As you know, we have practically given up the idea of starting silk culture in the United States." Our experience has shown the facts given in the enclosed letter, which I am sending out now to applicants for silk culture information.

The practical investigation of silk culture by the Department of Agriculture, on which we base our recommendations, began, as a result of an agitation of the subject dating from the Centennial Exposition of 1876, and was carried on by virtue of specific appropriations by Congress, continuing, practically, from 1884 to June 30, 1891. The experiments were conducted on an extensive scale, the work being placed under the supervision of the Division of Entomology.

The experience prior to 1886 had established the possibility of raising a most excellent quality of silk worm cocoons over nearly the whole country, but it had also fully demonstrated that the superior price of labor in the United States put any possibility of profit in the industry out of the question. This

was largely due to the fact that it was found impossible to convert the cocoons into raw silk, namely, to reel them, in this country in competition with the cheap labor in foreign silk-raising countries. Hence, in America, there could be no market for cocoons, and to sell them in France or other European countries meant a smaller compensation even than that received by the peasant silk raiser of Europe, on account of the long distance of freightage.

The work of the department was, therefore, especially directed to efforts to remedy this state of affairs, and to equalize by improved machinery the difference in wages between our own and foreign countries, thus making it possible for the manufacturer to pay a better price for cocoons. Electric silk reels were set up and remained in operation for several years. Improvements in these reels were constantly being made in the direction of economy and efficiency, but it was definitely shown by 1890 that no silk reeler could afford to pay a price for cocoons which would induce even the poorest of our citizens (or even the non-producing members of his family), to undertake the more or less arduous labor of raising worms. The sole remedy at that time seemed to be the levying of an import duty of not less than $1 per pound on reeled silk imported into the United States. An effort was made by friends of silk culture to secure such a duty at the time when the McKinley tariff bill was under discussion in Congress. The effort, however, failed.

In view of the above, there can be no question but that serious disappointment will surely follow exaggerated ideas upon the subject of silk raising for profit in the United States, and if you are contemplating such a course you are very strongly dissuaded therefrom.

HAWAIIAN FOREST TREES.

After alluding to several pests of Hawaiian forest trees, Prof. Koebele says: Now we come to the greatest enemies of the beautiful Hawaiian forests, the worst and most destructive ever introduced among tropical forests, which will sooner or later, but positively and entirely disappear before the army of devastating cattle. I doubt that anything in nature, axe and fire included, would have in the same space of

time brought the once densely clothed Islands to the present condition.

If we could look backward fifty or sixty years, we would see the two large mountains of Maui meet by trees on the plains; Lanai and Molokai clothed with forests; Oahu the same, native trees in numbers down to Honolulu; four miles or more of a dense and impassable virgin forest in Nuuanu valley; the Waianae mountains with a mantle of beautiful green vegetation; Kauai, the fairest of all, the Lihue plains an undisturbed forest, as all along the west on the windward side, and the forest on the leeward side coming down to the sea, in parts at least. We would see in places uniformly running streams, and ever-flowing springs. Doubtless such has been the condition of the Islands. The changes have been brought on to the benefit of the very few, to the detriment of the whole Islands and community. Today, especially on the leeward side of the Islands, the cancer spots are visible everywhere and growing continuously; the grass has disappeared, each successive rain takes away more of the soil, and during the sunny days the wind is taking the same far out to sea. With these conditions, these barren spots will grow into barren rocks, where not even the denounced lantana (the salvation plant of the Islands) will grow. I fear to express an opinion of the state of conditions fifty years hence; yet we must trust in a body of men to form laws and regulations filling the demands of the Islands. What is mostly and immediately wanted are strict laws to compel every cattle owner to fence in his or her cattle, and liberty to any one to take or shoot any animal found outside such enclosures, even paying a bonus for any such beast so destroyed.

On the lower end of Puuwaawaa Ranch, we find a mixed forest of a large number of trees, among them some of the most valuable timber, such as the Sandal Wood, Santalum Freycinetianum, the "Kauwila," Alphitonia Ponderosa, and many others growing among the lava rocks. Some four or five species of trees are destroyed by the cattle that eat off the bark, like the "Wiliwili," the "Papalo," and other soft-wooded species.

The principal food of cattle in this district is the underbrush, breaking the rays of the hot sun on the lava rocks; the animals will browse upon the young trees, and eventually

destroy the same, leaving the older plants with the surface wood exposed. It is only a question of a few years until all the trees on such places disappear entirely. Example, the piece of land between Mr. John McGuire's house, and the lava flow north, with former forest dead and dried up timber on the ground. It took the cattle a very few years to accomplish this.

The upper part of the ranch comprises some 12,000 acres of fertile Government land, covered with valuable forest trees, among them the famous koa. It is here where we have seen the sandal wood tree over eighteen inches in diameter. Five years since the present leaseholder had to hew a trail to see the condition of the land; today we find a handsome open park land, so to speak, where one can ride anywhere on horseback. I venture to say that at the expiration of the lease, twenty years hence, we will find an open pasture land, very much in want of moisture.

For the benefit of the country and community at large, the Government could well afford to pay the lessee one thousand for every dollar it receives as rental for the rest of the term. Leaving the necessity of a forest out of the question, the protection of these valuable timber trees alone would sufficiently pay for all outlays.

With the kind help, and the furnishing of the native names by Mr. Low, we collected and brought down seeds of the following species of trees, now planted at the Government Nursery, and at Moanalua:

Wauke, Broussonetia Papyrifera; Kauwila, Alphitonia Ponderosa; Alani, Pelea Sp.; Aiea, Nothocestrum Breviflorum; Kea or Kalamona, Mezoneuron Kauaiense; Halapepe, Dracaena Aurea; Olapa, Cheirodendron Gaudichaudii; Hoolei, Ochrosia Sandwicensis; Iliahi, Santalum Freycinetianum; Naio, Myoporum Sandwicense; Aulu or Kaulu, Sideroxylon Sandwicense; Mamani, Sophora Chysopylla; Pua, Olea Sandwicensis; Papala, Charpenteria Obovata; Pilo, Kadua Grandis; Aalii, Dodonaea Viscosa; Awikiwiki, Canavalia Galeata; Wiliwili, Erythrina Monosperma; Kookoolau, an ornamental, yellow-flowering, composite shrub; seeds of one of the numerous Lobeliacaea; Alahee, cannot be found in Hillebrand; Aa, a large tree only known to Mr. Low in a couple of specimens.

NOTES ON INSECTS AFFECTING THE KOA TREES.

WRAY TAYLOR,. ESQ., Commissioner of Agriculture and Forestry. Sir:—As requested, we visited the forests of Maui to the windward and between Makawao and Olinda. More properly, the investigation in regard to the reported destructive insects were made in the neighborhood of Hocking's old sawmill, where for the last few years a successful attempt has been made to reforest the district, at one time a dense and impassable jungle. At the present time, where the forest had been cut, we find remains of old koa stumps in a decaying condition still standing and upon the ground. Larvae and mature insects of Parandra Puncticeps, a Cerambycid, is present in large numbers, as also Aegosoma Reflexum, formerly on sugar cane at Spreckelsville.

There are very few indigenous trees. Everything covered by the Hilo grass seriously interferes with the growth of young trees; in fact, the space around the roots has to be kept free of grass to allow the young plants to grow. Practically all the trees planted by the Hon. H. P. Baldwin are of foreign origin, succeed well and are hardly affected by insects, save the so-called "Olinda bug" devouring the leaves. This gentleman informs me that the planting will be kept up to the extent of some 60,000 trees per annum until the whole district is again covered by a forest so ruthlessly destroyed for the benefit of a single individual. Mr. Baldwin had large tracts of grass land plowed, and the young koa trees sprung up from the ground by the hundreds, and from all appearance in years to come, these valuable trees will again become more numerous.

Mr. Baldwin informs me that some four years since, all the old koa trees in the whole district died. Today, even the dead tree tops can be seen everywhere. It would be a most difficult matter to say with any certainty, at this date, what agency has brought on this wholesale destruction. As I am informed, the animals had been taken out of the forest some two years previous—nevertheless the after-affect may be noticed for many years to come. We know that by clearing out the underbrush by cattle, exposing and injuring the surface roots of these trees will bring them in a condition not to be able to withstand one of those periodical defoliation by the spanworms (Geometrical larvae). We are not positive whether

the Hilo grass has run all through the forest or not, but in places visited the same is covering everything, changing the whole condition of things, and still we find any amount of the healthiest koa trees of all sizes, at the present time, even in the open, wind-swept land, where no animals are found.

The so-called "Olinda bug," Pandamorus Olindae, Perk., also found on Oahu, and lately in destructive numbers at Kohala and Kau, on Hawaii. The injury of this beetle to trees is in reality not as serious as it would appear, and its presence upon older trees is barely noticed, while upon the young trees growing amongst the Hilo grass, its presence is more apparent. We have seen many trees of the Java plum, recently planted, with every leaf eaten off, and some have died from the effects of the beetle and Hilo grass combined, while others again barely showed any sign of the beetle. Reports from Kohala state that the beetle also devours the bark of young trees; this we have never observed, but yet have no doubt of its accuracy where food is scarce. Most any plant or tree is attacked by the beetle and even the grass. The insect appears to be most numerous along the border of the forest, and it is found from the sea shore up as high as 5,000 feet. Seven years since we have been shown the beetle at Paia, destructive to roses and garden plants in general. Mr. Perkins reports of having seen remains of the same at the base of koa trees near Olinda, some years since, to a depth of several inches. It must have been present on the Islands long before it became prominent, and it is likely an introduction from Mexico, and probably came from Acupulco.

The life history of the beetle is as yet, but imperfectly known. We have found its larvae under stones at Olinda, four years since, and collected large numbers of the same in all stages, on this trip, feeding on the roots of Hilo grass. We have obtained its eggs in confinement, deposited in clusters of some seventy-five, of a light yellow color from three-fourths to one M.M. long and half as wide. At the office we find that large numbers of young larvae issue from galls produced by the Tortricid larvae. Here the eggs are inserted anywhere conveniently where a hole is present, and are imbedded in irregular masses, partly covered by excremental remains. We should think that they are also found under the bark of trees where the beetles feed on. In gardens and

small areas of land the beetles are easily dealt with since they are wingless and can only crawl. They can readily be shaken off smaller trees and destroyed in a bucket of water with a little kerosene; this can be done at any time during the day or night, while the beetles remain stationary upon the plants, and, if numerous, will congregate in clusters.

Of enemies the Pandamorus Olinda has not many. The indigenous Carabid beetles on higher elevations must destroy many of their larvae.

Insectiferous birds evidently feed largely upon the beetles. We found excrements of the mynah bird consisting entirely of remains of these beetles. Quails are considered as excellent birds to destroy such insects, fowls, should keep the surroundings of houses free of them. Probably some 90 per cent. of the food of the mongoose consists of insects, roaches, crickets, grasshoppers and centipedes, and, from examination made, he also feeds upon the "Olinda bug."

Larvae of a Tortricid.—A young koa tree in tender, terminal twigs, long, gall-like swellings are noticed of various lengths, the small moth laying its single eggs, no doubt, in the axis of leaves and the young worm on hatching enters the tender wood at this place, where it remains until full grown, forming this elongated, gall-like swellings. On maturing, the larvae leave these galls, probably to pupate under the bark of the trees. We are breeding the same, and shall give a full account at some future time. As I have been informed by the forester, Mr. Lindsay, it is only at certain times in the year when these worms are found. Not only are those larvae found living within young and healthy wood, but we found them inhabiting other swellings of branches produced by a more serious enemy to the koa tree, a fungoid disease; in fact, these very larvae were repeatedly seen to devour the tender galls and spores of this fungoid, both on twigs and upon the leaves, and thereby are in reality beneficial in this case. These gall-like swellings are found most numerous upon branches affected by the disease, producing a tender, spongy growth.

Geometrical Larvae.—Several species of span-worms are found to live upon the koa leaves on all the Islands, and at times become so numerous as to defoliate the entire trees. We found them common everywhere, yet not in any serious

quantity. Pupae of same were found under bark and in the ground. The Asiatic parasite, Chalcis Obscurata, is amongst them, preying upon the chrysalids wherever this can be reached.

FUNGOID DISEASE.—Generally towards the windward side, the trunks and branches of young koa trees appear to be covered with peculiar gray elevated spots, small on the trunk and larger in size towards the terminal twigs, which in addition show roundish swellings of various sizes. At joints of branches and axis of leaves, before an advanced stage, when the leaves are still present, the latter show irregular swellings covered with brown dust—the spores of the disease. Often the entire leaf may be affected and is then curled up in all sorts of fantastic shapes, becomes black and dies off. The elevated spots on branches burst open to release the fruit of the disease. The round swellings may often grow in a spongy mass one inch or more in diameter. The wood on terminal twigs is all affected and spongy, and a favorite place for the Tortricid moth to lay its eggs. The galls produced by the larvae begin to swell on the inner walls and split throughout the whole length. Small trees are affected in open grass land generally succumb. These conditions have not been noticed, or only slightly, upon young trees growing under original conditions, amongst ferns and protected by large trees. Doubtless this disease is found upon the koa trees on all the Islands, yet it is hardly noticed upon healthy plants growing amongst proper natural environments.

Respectfully submitted,

ALBERT KOEBELE,
Entomologist.

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MANGO BUDDING.—A Jamaica publication says: "Budding the mango has been generally considered an impossibility, but this is a mistake, because it is done by experts in Florida, and it can be done by others when understood. The secret lies in taking the buds from about the middle of the growing shoot where they are well developed, and yet not too tender —where the color of the bark is just turning from green to purple—and at a time just prior to a vigorous stage of growth in the tree to be budded. The shield method has been used, but the ring or plate style would be better."

PLANTATION LIFE IN BRITISH GUIANA.

An Overseer's Story.

"It is the hour of dawn."

Bang, Bang, Bang, Bang, Bang!

The deep-toned bell tolls for the hour of five and the night-watchman calls, in reply from the gates of the factory, "Panz dujjal hai!" ere he snatches his lantern and starts on his rounds of the overseers' barracks.

Knocking loudly and long at every door until he is satisfied by every audible sound of dissatisfaction from within that each inmate is awake, on he goes until his tour is completed for the first time. Spread it not abroad in Gath, but true it is that a plantation bell invariably tolls, at noontide, half an hour after the real hour for "knocking off" has passed and a like period before the legitimate time for arising is at hand. Therefore our friend the Overseer is rendered all the more savage, as he tumbles out of bed, by a glance at his watch, which is emphatically denying the announcement of the bell, by pointing at the hour, half-past four, and he meditates a return to bed "for just a few minutes more." But the movements of his brother Overseers on either side of him and the recollection of the frigid "Good morning Mr."—which is kept by the Manager expressly for tardy arrivals at the coffee table, eventually determine him, so he plunges into his bath, and emerges wide awake just as the night watchman (conscientious man) arrives to go his second round to make sure that every one is awake and at the same time to gather together the books containing the accounts, of all the work, etc., done in the fields on the previous day.

A hasty scramble into old and loose togs and our friend clatters downstars, struggling into his jacket as he runs, and joins his brother overseers on their way to take the matutinal meal at the manager's table.

There is only a faint flicker of dawn in the east as the men troop down the barrack steps, but last night's moon has not yet been extinguished. So let us take a look at the overseers as they go on their way.

That short, sturdily-built Scotsman is the Head Overseer, and the portly Irishman by his side is the Buildings Overseer. Behind those two troop about ten men younger perhaps

than the seniors, but they are all tanned thoroughly, through exposure to the ardent sun and beating rains of Guiana, and all are stepping with the vigor of men accustomed to a life of almost continuous activity in the open air.

Scotsman preponderate, but there are Englishmen and a few Colonials as well, all looking fit and hardy. They reach the Manager's residence, and file into the dining room where they are joined by the "Boss" who examines and criticises the books while hot coffee, unlimited cold meat and delicious bread and butter are being consumed by the overseers.

At the conclusion of the meal they all adjourn to the steps leading to the yard where the coolie superintendents (locally termed drivers), are drawn up into a line, headed by the head superintendent on the plantation.

It is here that each of the East Indian Immigrants who considers he has cause for complaint against his gang drivers, his fellow-laborers, his overseer, or against anyone or anything, makes his declaration to the manager in person, bringing forward any witness or witnesses he may have to substantiate his complaint. Some extremely amusing stories are here told, some very droll subjects broached, to all of which the "Chief," who is a J. P., listens attentively, inquires carefully into them and settles such as are of more trivial nature while he sends on the more serious offences to be dealt with at the Magistrate's Court of the District. This business, for business it is, finished, orders are then issued to the superintendents of the different gangs as to which section of the plantation each gang is to work in, and what work is to be done by each gang; then the "Chief" goes upstairs and the overseers, each followed by the driver of his gang, start to walk around the laborers' ranges, calling upon his people to "turn out" to work, and threatening the would-be idlers with the "extreme penalties of the law" if they venture to disobey his orders.

A visit of short duration to the plantation's hospital brings the overseer's rounds to its end, and our friend hastens to his quarters where he gets into his riding togs at top speed, and descends to mount his mule, which by this time is awaiting him, having been brought up from the stables and saddled by his coolie boy.

Let us presume that the day is Monday, and khaki is fresh from the laundry 'ere the week's toil has rendered it a

nondescript color. If this be the case our friend and his colleagues present quite a picturesque appearance attired in khaki riding breaches and tunics finished off with stout boots and leather gaiters while their heels are armed with formidable spurs and their heads are protected by broad felt hats in various stages of repair or the reverse.

A friendly rivalry exists amongst the younger men as to whose mule is the fastest and who can ride with the greatest "aplomb." Therefore, before the manager has re-appeared on the scene five or six of the younger men mount, and, with guileless, faces, as though looking forward to nothing out of the ordinary ride sedately out of the yard.

Over the bridge, and around the corner they go, and then a hair-brained Colonial catches his mule by the head, digs his spurs in its side and is away with a hoop. "Devil take the hind most seems now to be every man's motto, for a rush ensues amidst which the "latest joined from home" parts company with his mule, and is rapidly left behind by his delighted comrades, to say nothing of his more delighted mount.

This burst is as short as it is exhilarating, however, and one by one our friend's companions drop off at the "cross dams" on the way to their own gangs, until, at last, he too reaches the section in which his gang is at work, where he dismounts, leaving his mule in charge of a small boy, and proceeds to walk through the fields accompanied by the chief driver of the gang—directing, chiding, threatening, blarneying, and—spread it not abroad—swearing at the laborers according to their respective merits or demerits.

To carefully examine the work of a gang numbering 200 or more people, who are spread over five or six fields, is no easy matter, and our friend returns home about noon, late for breakfast, hungry, thirsty, tired, perhaps wet through if there has been rain—for there is no shelter; but he finds a hot meal awaiting him, which he discusses with a keen appetite and then goes to his quarters to spend half-an-hour in his big Berbice chair with his book and the inevitable pipe ere he again mounts and starts for "aback."

Punctually at one o'clock the mules are brought up to the overseer's quarters and our friend, refreshed and ready for work, mounts and is off again. The morning's programme

is repeated, the fields are all walked over from end to end, and as he strides along our friend enters into his field or check book the names of each laborer and the number of cane rows worked by him or her, also the amount of money due him or her for such work. Thus the afternoon is spent until the westerning sun tells of the passing of another day, and then our friend is at liberty to get him home again. Another wild gallop soon brings him in sight of his quarters, and it is a very tired man who climbs out of his togs, pigskin, etc., as the factory bell slangs out its five strokes, as usual thirty minutes beyond the standard time.

A shave followed by a shower bath and rub down then a real good dinner at the Manager's table freshen up our friend sufficiently for him to make up his pay list from his field book, and to write the report of his day's work for the Manager's inspection tomorrow morning at coffee; but when these matters are concluded, and after a few more chapters of the book he has been reading for so long or the last newspapers from "home" have been enjoyed, to the accompaniment of a second pipe, our friend considers himself about fit for bed and a second sleep, which he surely will have at the end of such a day's work. Bang, bang, bang, and so on until ten strokes have been rung out from the factory bell, and the night watchman sings out in his sonorous tones "Dus bappal hai!" (ten o'clock). Then our friend knocks out his pipe and takes refuge under his netting from the enormous mosquitoes which have been making themselves unpleasantly conspicuous ever since the darkness set in.

Thus begins and ends the day. The next begins, continues and ends in like manner. The life of an overseer on a sugar plantation is not a bed of roses by any means, and tiresome indeed would such a life of incessant toil be were it not for the "breaks" which often come in the form of small amusements. Evenings spent with some of the residents on the coast, whose hospitable doors are ever open to our friend, the overseer. Tennis, when the "Boss" honors some of the members of his staff with invitations to his parties. Then there is an occasional gymkhana arranged by the manager for the amusement of his overseers and people as well as for the entertainment of his friends. Another and very pleasant "break" is when the manager has guests for dinner. Then our friend really has a good time, for the sight of fair matrons

and charming maidens reminds him of the "home" he left long ago, and while he feels a little tightening of the heart at the recollection, he yet enjoys the present immensely, and goes to his room, in the barrack, after the evening is over, feeling refreshed and invigorated by the bright and merry laughter and conversation to which he has listened (not to mention the sparkle of the champagne which so generously has gone rounds).—Barbadoes Advocate.

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AMERICAN CANAL PROJECTS.

Mr. Pierpont Morgan, the great American capitalist and financial genius, has denied according to the telegrams, that his visit to England had anything to do with the projected completion of the Panama Canal scheme. This is very likely, but as Mr. Morgan's name is one to conjure with in London and New York financial circles, it is not likely that he would admit to a newspaper representative, or any other person what great scheme he had maturing in his brain until it was ready to be launched, as his whole policy in life has been to keep his own counsel and reap by himself the results of his vast undertakings. Until the present year little has been heard of the Panama Canal scheme since the exposure of the maladministration of M. De Lesseps which brought ruin to many who had financed the project. Of late, interest in it has been revived by the proposal of the United States to favor the construction of the Nicaragua Canal, which was on the point of being undertaken in 1850. This canal would run from Greytown, on the Atlantic, by way of the San Juan River, Lake Nicaragua and the valley of the Rio Grande, to Brito on the west coast. From end to end the waterway would be about 186 miles long, of which less than thirty would be excavated canal. It is estimated to cost not less than £60,000,000, which is a moderate computation. It would be a lock canal, Lake Nicaragua at high water mark being 110 feet above sea level, and a depth of 35 feet at mean low water, and with a bottom width of 150 feet. The time of transit is estimated about forty hours, and the route lies through rich and fertile districts, and no tunnelling would be necessary. It is not likely that any European Power would have objected to the United States undertaking this work had

it not been that the Senate adopted amendments to the treaty drafted by our Ambassador, Lord Pauncefote, and the United States Foreign Secretary, Mr. Hay, regulating the administration of the proposed Canal. In this treaty were introduced clauses similar to one in the treaty governing the use of the Suez Canal, and corresponding with the terms of the Panama Canal treaty, declaring it neutral in time of war. The purport of the Senate's amendments was, first, to wipe out the neutralization clauses of the treaty, so far as the United States is concerned, and give the American Government the sole use and disposition of the Canal for its own benefit in time of war; and second, to bind Great Britain to a recognition of these belligerent rights of the United States in the Canal, while freeing every other nation in the globe from the obligation to respect this arrangement, except when forced to do so by the military and naval occupation of the Canal by the United States. Naturally, Great Britain has declined to consent to any such agreement as it would be tantamount to its agreeing that a treaty is made only to be broken, another treaty, the Clayton-Bulwer treaty, involving the same neutrality provisions, already being in operation. But the controversy over the matter has directed attention once more to the neglected Panama Canal scheme, whose completion is not only feasible but could be carried out by foreign capital without the right of intervention on the part of the United States. The Columbian Government, which is the State whose interests are most directly concerned in the enterprise, has started negotiations with the Washington Government on the subject, and in view of the attitude of Great Britain towards the Nicaragua scheme, there is a probability of capital being raised for the successful carrying through of the canal which France had previously so greatly helped to finance. The advantages on the side of this canal are length, alignment, maintenance, operation and winds, and the fact that a sea-level canal could be constructed. Marines favor Panama in preference to Nicaragua for the reason that it is one-third the length, would have fewer locks and curves, and would therefore be less dangerous, and would involve less expenditure for lighting, guarding and other necessary items of operation. Whether Mr. Morgan's visit to London is for the purpose of forming a syndicate to undertake the completion of the Panama enterprise or not, there is every probability of Euro-

pean and American financiers raising money to complete the operations begun under the contract of M. De Lesseps, which will mean that the United States' Government will have to abandon her pet scheme, as the existence of another canal would nullify any advantage she hoped to obtain by having complete control over an American inter-ocean waterway.

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ORIGIN AND LIFE OF THE CANE BORER.

(A paper by Dr. A. Rouif, read before the Louisiana Sugar Planters' Association.)

The cane borer is an insect which belongs to the diurmal rhopalocerous or lepidopterous insects, and may be called in a figurative sense a "gay idler" or "trifler."

Like all other insects, the cane borer comes from the soil and returns thereto. First, it is a germ like a great many others accumulated in the alluvial ground deposited by the Great Father of Waters, and which ground contain a great deal of hydrogen. The cane borers, in common with all other germs of whatsoever nature or kind, look for such new elements and substances as will effect their natural development.

As previously stated, these special germs of the cane borer abound in alluvium, and, being brought in contact with substances favorable to their development, such as softening the ground, exposing the soil to a temperature that will absorb part of the hydrogen which it contains, thus rendering the soil richer in azote or oxygen; or, through the influence of other substances, such as fertilizers, these germs develop gradually and take their vitality and sex.

EXAMPLE—Take a wheelbarrowful of manure, put it on a weeded and well-cultivated piece of ground, etc.; then, fill the wheelbarrow again and leave it standing by the other pile, side by side, and exposed to the same atmospherical influences during eight or ten days, then scatter the manure that is on the ground, and you will find quantities of insects and worms that have developed and taken life. This done, the worms long for food, and naturally turn to those plants which will satisfy their appetite. But on examining the manure in the wheelbarrow you will discover nothing, save a high temperature. For want of contact with the germs contained in the soil, no insect life is noticeable.

The cane borer once ushered into life, assails immediately some bud or shoot, and thus gradually gathering strength, it enters the plant, which growing, carries the cane borer to the surface, breathing there a warmer atmosphere, which contains more oxygen and ozone and less hydrogen. It thus acquires full strength and development, gnawing in seven or eight days a quantity of cane varying from three inches to five inches in length. As soon as one of the knots separating two consecutive joints is reached, the cane borer retraces its steps, descends to the opening it has made, and directs itself towards the upper and more tender part of the cane, where it renews its work of destruction, until it finds itself fully developed and ready to be metamorphosed. The duration of its work is hard to determine and depends upon the temperature, which, if favorable, thirty or forty days are sufficient, if unfavorable, a longer period is required. In either case, the cane borer must have such an abundance of food as will enable it to store a sufficient quantity of gelatine to form its case or cocoon, and at the same time sustain life during the eight or twelve days of its metamorphosis.

On the 15th of November, 1900, I collected some worms, which I nursed until the 15th ult., without their showing any tendency to metamorphose, while on the other hand, those that came out early in the spring, had been born in the fall, at or around the grinding season, their instinct of self-preservation prompting them to quit their abode in the cane and take refuge in the ground.

Their Propagation—As we have seen, the first worms are born of the two sexes and at a favorable time in spring, come out of the cane, as I have ascertained on several occasions. I have found them with their heads downwards, directing themselves towards one of the orifices previously noticed. Once out they nestle under some leaf, seeking the shelter of the east winds, so as to receive the best and most genial rays of the sun; they then form their case or cocoon, which is completed in a day or two. This done the worms are metamorphosed within a space of ten or twelve days, after which they gnaw open their cocoon and fly away.

I have been fortunate enough in my investigations on Peytavin plantation to find there egg deposits on three different leaves. The first deposit contained fourteen eggs, the second, eleven, and the third, seventeen. Among them, some were of

a deep brown or almost black color, but the larger number were of a deep yellow-amber color. I believe that the latter were better fecundated. The period of incubation varies, as hatching depends on the temperature; however, judging from my experiments with silk worms three or five days suffice, a few days more being required when changes occur in the temperature. As soon as the nits are hatched, the young direct their steps towards young shoots, continuing the ravages of their progenitors. The mother butterfly continues its work of propagation over the whole plantation until autumn, when she, as well as the male, die.

Borers propagate easily, especially in those places where they are already in innumerable quantities. Planters who have never had their plantations infested with the borer are very much surprised during the grinding season, to discover that the ravages of this destructive creature reach between 5 and 10 per cent of their whole crop. Whence comes this scourge? It was unknown to these plantations the year previous; no fertilizers are used thereon, and they are at a distance of five, ten or fifteen miles from the strongholds of this pest, where a damage of 20 per cent or 25 per cent prevails; nor are the riparian plantations affected, for no one there is complaining. The cause of this sudden and destructive scourge lies in the fact that winds and storms take up swarms of butterflies and transport them in great numbers. If these numberless butterflies are deposited in woods and forests, they soon die out and disappear for want of proper food; but, the case is different when these swarm alight on a plantation. Have not any of you, gentlemen, remarked on some mornings, that your wards are covered with numbers of small frogs, or that portions of your plantations, say five or ten acres of cowpeas, are literally overrun with myriads of grasshoppers which were not there the evening before? Whence come these unpleasant travelers that in seven or eight days spread ruin and devastation over fifty or seventy-five acres? Well, gentlemen, let me tell you, they used the wind as a means of transportation. This incontestable fact clearly demonstrates the rapid propagation and dissemination of the butterflies and cane borers. To-day, with the innumerable quantity already developed, the propagation and dissemination of this pest will be more rapid, and will inevitably invade a larger number of plantations.

The cane borer has been in existence since the days sugar cane was first planted. Some planters say that the ravages made by the borer vary from year to year. This is perfectly admissible, and if, as I have just told you, the winds have carried away the butterflies from your fields, you are thereby benefited, and here is a theory whose certainty you are going to acknowledge, for every phase of this theory has been for me the subject of a special and most laborious study. Because temperature influences the borer, I here state the fact, that frost alone can reach the borer in the young cane planted in the fall; for, these young shoots, having, by their growth, carried the borer out of the ground, there is naturally an end of the pest, especially if the canes, owing to favorable temperatures, have grown to a considerable size; as, in this case, a larger amount will have been destroyed. All the borers that are in the ground could be exterminated in the same manner, but this would prove disastrous to the crop in general. On this point, I must draw your attention to the fact, that three years ago, the severe cold of an unparalleled winter, played havoc with your cane seed, and that, as a consequence, you had few borers in the spring. However, the few borers that remained have gradually increased. Another source of destruction for the borers lies in the fact that once every four years the destruction of cane stubbles and the planting of corn and cowpeas instead bring about the starvation and death of many borers, as neither corn nor cowpeas are food for the borer.

The first, second and third years' cane have a greater number of borers, especially so, as the fertilizers applied to the first year's cane contribute to the development of borers in those fields in which borers had disappeared the year previous, for the want of proper and suitable food. Another and surer way of propagating germs comes from the fact that the cane preserved for seed still contains a limited number of borers. I will go farther and state that you foster borer cultivation, especially now that their former enemies have completely disappeared within the last 25 or 30 years.

Enemies of the Borers—Gentlemen, I will now give you an account of my studies on the enemies and destroyers of the cane borer. My observations have all been made in the plantations of Mr. E. J. Kock, Belle Alliance, Scatteray, and the Front. To begin, I will here state that, judging from maps

given me by the secretary of the Louisiana Planters' Club, the parishes most affected by the pest were those extending from Donaldsonville down Bayou Lafourche east and west to about eighteen or twenty miles farther; then on both sides of the Mississippi, northward to about eighteen or twenty miles, then southward on both sides of the river as far as New Orleans.

My second observation is that the borers are most numerous in localities having the greatest number of inhabitants. A third observation disclosed the fact that plantations to the north are less thickly populated and in closer proximity to large forests. These observations may appear strange and queer to you, but these are the consequent results. You will remember, I am sure, that before the great civil war when the population was less in numbers and planters and merchants alone could possess firearms and hunt, your plantations abounded in millions of crows, snipe and black birds which feed exclusively on the worms produced. These various birds have almost entirely disappeared, for there were men who every spring caught thousands of them by means of traps and sold them to merchants of the Eastern States. In those days, birds were so numerous behind the plow that any hunter could kill from fifty to seventy-five in one shot. What were these birds, so confident of your sympathy, doing behind the plow? They were working for your own interest and without your being aware of it. More still; since the days of the Emancipation Act, all your colored people have procured guns, and have one, two, and sometimes three hunting dogs. In their leisure hours, those same colored people go in your plantations and woodlands, and hunt all day long, killing and destroying every living creature in their path. Now come the Italians whom you have been importing for the last two years, and not one of whom goes out but he carries a hunting-gun on his shoulder. In the borer-infected regions, described by Dr. Stubbs, along the Brules and Smoke Bend to Bayou Corne, and on the north around Lake Verret, one may hear from morning till night, throughout the year, a continual fusilade. The same cruel and merciless chase is going on, on all other lines. Why should not borers, in the presence of such advantages, be masters of the situation? I told you at first that I had made special and attentive studies on the plantations owned by Mr. E. J. Kock; I came back to

these plantations, for, like many others, they are centers of infection. According to his own calculations, he lost about 20 per cent of his whole crop; and this, I believe, for I was in a position to judge of the large quantities of cane that had been destroyed by borers. I then began to examine the canes that were around the residences of the laborers on Scatteray plantation. All those families raise poultry, from twelve to fifteen fowls to each family; and, as there are seven houses, we have for the seven houses, 100 chickens; for stablemen, 50 chickens; for Mr. LeBlanc, manager, 150 chickens; making a total of 300 chickens. These three hundred chickens wandered over a cane field within a circuit of 400 or 500 yards. In this same territory I could hardly detect a single borer, while the rest was completely overcharged with perforations made by the borers. I continued my investigations on Scatteray while spring planting was in progress. Mr. LeBlanc, the manager, was busy in digging up canes which were windrowed during autumn. This was on the south side of the plantations, and he was transplanting them about 700 or 800 yards farther north. I found on the young sprouts, of three or five inches in length, many borers, and young eyes entirely destroyed; the seed cane was of poor quality; and, on the opened rows, there were a few gray birds, which we call snipe. In the spot where the planting was going on there were birds looking for food. Behind the plow the birds were too few to give any hope that they could rid the land of borers. I directed my steps northward for a short distance to Belle Alliance; and there, with Mr. Greenwood, the manager, we found that the facts and results were identical to those elsewhere.

On Thursday, February 7th, just eight days later, I went to the Front plantation, managed by Mr. Hanson, who was planting beautiful cane, in which there was not a single perforation. The distance from these two strongholds on these plantations was about a mile. I must here add, that there was not a single bird near, neither where he was planting, nor near the seed rows. I drew his attention to this and he told me that two days before he had been planting borer-infected cane near this plantation, and the birds referred to followed behind the plow. I went about 1,000 or 1,200 yards farther on Scatteray plantation, and saw these same birds take flight,

and go right and left, without directing their course toward the Front plantation.

From this, gentlemen, there is no doubt, whatever, that the enemies of the cane borer have disappeared, and that it is necessary to resort to some artificial means for borer destruction.—Louisiana Planter.

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THE COFFEE TRADE.

Cheap coffee has greatly stimulated consumption, and, if the era of low prices continues for a few more years, love of the beverage will be so strong, and the habits of coffee-drinkers so confirmed, that prices will be abnormally high when crops fall below average annual requirements.

It is reported that Brazil will carry over one million bags of coffee of the 1900-1901 crop.

Caution is needed in accepting reports, especially from producing countries, concerning coffee crop conditions and probable developments; for, in the light of past experiences, they should be received with caution, and confirmatory news awaited before investment.

Mr. Hermann Sielcken, of W. H. Crossman & Brother, in reviewing the present coffee situation to a representative of the Journal of Commerce, said:

"Brazil has been sending sensational stories into the consuming countries, undoubtedly with the idea of affecting the prices at the commencement of the new crop. In the last four or five years of large crops, they have exhausted all schemes which the people would believe for awhile, and all of these sensations came forward regularly between May and August, the time when the crop is commencing to be harvested.

"In 1897-98, at the beginning of the crop, we had frost stories galore, and in July and August it was stated that the trees might be totally destroyed by frost. And last year the heavy rains were supposed to have reduced the outturn of the present crop very greatly, and this, together with the advance in exchange in Brazil, made the world extremely bullish at the beginning of the crop."

Mr. Sielcken attributes the overproduction to the "high

prices in gold paid to Brazil from 1887 to 1896," which "stimulated the production, and the fall in the value of the paper money of Brazil gave enormous currency prices as well as gold prices, and made this stimulus for values in the eyes of the Brazilian planters still greater. Planting was pursued with a vengeance, especially in the Province of San Paulo, where plenty of virgin ground was still open, and is still open, and where the planters still possess a great deal more wisdom than those of Rio by attracting immigration to replace slave labor. These efforts led to production never dreamed of.

"While values have been established on the same broad lines governing other staples—supply and demand—the coffee world has been trying to make out what influences of a minor nature had either caused a decline or would stop it. So far, since the commencement of the big crops in 1896, the Brazilians have been able to obtain good prices, considering the size of the crop, and the heavy losses have fallen almost entirely on Europe and the States.

"There is no question that the consuming markets have Brazil completely at bay. They have enough stocks on hand to enable them to wait until Brazil markets conform to the necessities as they present themselves. Facts have proven that neither speculation, the varying of exchange, nor increased consumption can cope with the present production. If prices fall low enough, and perhaps lower than the actual cost of production, it is likely to work its own salvation to the coffee market of the future.

"The spot quotation is now on the basis of 6⅜ cents for No. 7 Rio (the market standard), and prices are among the lowest on record. As a matter of fact, the lowest record is 5 7-16 cents. This was reached in September, 1899, at a time when the October option sold at 4.10 cents. The question which is receiving attention is whether the current figures should be accepted as indicating an era of low prices, as a result of overproduction and of the cheaper cost of production, or whether they of themselves constitute the basis for an advance, on the ground that they do not pay the cost of producing coffee, and that the production will on that account naturally be curtailed."—Am. Grocer.

HOW TO SUCCEED.

A gentleman, who is now a prosperous merchant, in a conversation with a representative of the Economist, said that his life was changed by a simple performance of duty.

"I was clerk behind the counter of a large retail store in Boston at a small salary. I had been out of work some time, and when I secured the position in Boston I was thankful, and I made a mental promise that I would perform my duties thoroughly. I had been working for two days with poor success; trade had been quiet, and it was difficult to get any customers. I felt somewhat down-hearted because my counter had been idle for some time. A customer making his appearance I tried my utmost to effect a sale, but do what I might I could not please the man. Everything was either too light or too dark, and if the color was selected for his satisfaction the 'quality' was not what he desired. I have a quick temper and at times during the transaction I felt that I could strangle the customer, but I quickly curbed my temper and went at him tooth and nail. I felt that my reputation as a salesman was at stake and it was a question to conquer or to be conquered. At last I made the sale, and with it came a great satisfaction, but I was not done with the man yet. I wanted to sell him more. He said something about sending his wife around to look at some dress goods. I promised to send samples of new patterns as they arrived. The customer thanked me and said:

"It has taken you a long time to sell me a few goods. Are all of your customers as hard to please as I?"

"It takes some customers but a short time to make their selections, while others wish to go slower; we are bound to please them all," I answered.

"Does it pay your house to devote so much time to so small a sale?" he inquired again.

"Yes," I replied. "I have taken pains to give you what you want. I know that you will find the goods as I say. You will have confidence and come again, and the next time it will not take so long."

"After getting his package he walked out of the store. In three days I mailed samples of the new dress goods to his wife, and the circumstance passed entirely out of my mind. In about a month I was transferred to another counter and received a slight advance in wages. Much to my astonishment,

I was taken away from this department after only a month or six weeks' trial and placed in another position. I could not believe that I was not giving satisfaction, because with each change an increase of wages was made. One morning I was informed that Mr. B. wished to see me. I went to the office with surprise and some fear. I was more surprised when I saw sitting beside my employer my customer of a few months back. He proved to be a silent partner but the moneyed man of the concern, whose other business interests kept him away from the dry goods store almost entirely and he was known to but few of his employees, although he knew that I was a new man as soon as he saw me, and thought to see what metal I was made of. That he was satisfied is proved by making me buyer for the several departments where I sold goods. My prosperity began with the tough customer, and now I thank goodness that I got him and that I did not show my disposition to strangle him.—Economist.

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THE ADVANTAGES OF MECHANICAL DRAFT.

Though not strictly a feature of the Pan-American itself, there will be located a stone's throw from the Exposition grounds a plant which will be well worth the inspection of the visitor interested in mechanical subjects. We refer particularly to the large plant which is being constructed by the Buffalo Railway Company for the purpose of furnishing power to aid in the operation of its street railway lines during the exposition period, when a great increase in its traffic is to be expected. One of the features of this plant will be the installation of a large mechanical induced draft fan to produce the draft, and handle the gases of combustion from a boiler plant whose nominal capacity will be in the neighborhood of 2,500 horse-power.

The fan in question, built by the Buffalo Forge Company, of Buffalo, N. Y., is 24 feet in diameter, of the three-quarter housing up-blast type, and rigidly constructed of steel plate, braced and stiffened with angle irons. The fan is designed as an exhauster with an inlet nine feet in diameter and will be driven by belting to a Buffalo 13x12 horizontal center-crank class "A" engine. In order to keep the bearings cool, a constant circulation of water will be maintained around them.

The short stack into which the fan will discharge will be of sheet steel.

This particular plant illustrates very nicely some of the inherent advantages of mechanical induced draft. For instance, there is no necessity for a tall heavy chimney, and again, since the whole construction is of steel plate it can be constructed and installed in a minimum length of time. Once in place, such an apparatus provides complete control over the conditions of combustion and renders the performance of the boilers independent of those conditions of weather, wind, temperature and the like, which influences plants served with chimneys. The intensity of the draft is in proportion to the fan wheel velocity, and hence can readily be altered to suit varying conditions.—Ex.

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NOTES ON THE SUGAR CANE.

A recent valuable and interesting number of the "Bulletin of Miscellaneous Information," issued by the botanical department of Trinidad opens with a list of sugar canes introduced into the island so long ago as 1873, the reporter, Mr. J. H. Hart, government botanist, thinking it desirable to keep a record of introductions "with a view of tracing in some measure the origin of canes now under cultivation in the West Indies."

Seedling Canes.—There is a note concerning the raising of new varieties of sugar cane that may be valuable to those of our planters who are interesting themselves in the cultivation of seedling canes. The following extract is given from a paper read by Monsieur de la Devansaye at the Hybrid conference held in London last year:

It often happens that the first and second generations of seedlings have very little new blood in them or none. Such seedlings similar only to the type have been abandoned, given up or destroyed. It is an error to do this because the variations may eventually result from very slight—almost unnoticeable—change of type. One must have patience, as the seed of the third and fourth generations obtained from these plants may unexpectedly give the desired change. It very seldom occurs that a variation is produced immediately among

first seedlings of species or hybrids: the process must be continued.

A careful selection must always be the principal aim of the raiser, because without that, far from succeeding in getting rapid progress or improvement and fixing a definite success, the success itself degenerates and returns to the type.

It is upon these lines, says Mr. Hart, that the work at the experimental station has been carried on.

THE NAMES OF SUGAR CANES.—Mr. Hart has been engaged in seeking the origin of the Caledonian Queen cane. He says:

I found a letter from Mr. Burnley Hume dated August, 1874, in which was recorded the sending of a cane called "The Queen" from New Caledonia to the Botanic Gardens in Trinidad. In this letter, Mr. Burnley Hume states that he does not repeat the history given to him of the good qualities of the cane, as he set them down as "fabulous," but that it must have something good about it. In the Trinidad Royal Gazette of 7th May, 1879, Mr. Prestoe states that a collection of sugar canes was formed in 1875, or shortly after the receipt of the cane from New Caledonia, and mentions as one of the varieties one called Caledonian Queen, and his description tallies with our Caledonian Queen of today. Mr. Prestoe mentions that the Caledonian Queen had been widely distributed to Jamaica and other places; Mr. J. M. Berkeley, who was said to have introduced it into the island of St. Kitts in 1888 from Jamaica, repudiated the honor and ascribes it to Mr. Reid. From St. Kitts it was again imported into Trinidad by the writer a few years since and by several planters.

Dr. Morris states that the same cane under the name of Mamuri, and again under the name of Rappoe was introduced into Jamaica and other islands. Commenting on the "confusion" of names, Mr. Hart says:

I am well aware how sure the planter generally is of his canes, and many may accuse me of garrulity when I state, that I believe there is more than one variety of Bourbon cane in cultivation. If really so or not, the experiments would prove it and if indeed so, how much is to be accounted for in the non-yielding character of certain fields and estates planted with such varieties. It is therefore indispensable that the planter should really be sure from properly conducted experiments, which he himself may have no time, or

money, or opportunity to carry out, that the canes he grows are true to their names, and are not being cultivated under inconvenient synonyms. The name of a cane should mean one variety, and one only; and if proper names were ascertained and type specimens of such canes maintained as standard kinds in a public institution, it would be easy at any time by comparison to identify or determine any kind presented. Further, it should be the business of Agricultural Societies to elect what varieties should go on to the list of standard kinds after being sufficiently tested. For instance, X 41 is brought up for election, and the evidence goes in favor of sugar production, but is rejected on account of being weak or tender in the field. Y 52 is condemned on account of poorness of juice, while Z 105 is elected as being all round a good cane. Much money might in this way be saved by planting true standard kinds instead of varieties resembling them which are of no certain or ascertained value. The seedling canes now being raised must come under the same category, and standards must be kept at a central station, so that any mistakes occurring in the field planting may be rectified before comparisons are made. It has occurred already that labels have been transposed and some of the newer kinds have been mixed up on estates, but by the means suggested, a reference to the standards would at once inform the planters the true name of the kind he grows.

Another Enemy of the Sugar Cane.—Mr. A. Collens, one of the cadets attached to the Experiment station, St. Clair, recently discovered the larvae of Rhynchophorus palmarum, the well known Gru-gru worm or Palm Beetle, making an attack upon a cane growing in the station lands. This larvae destroys the cane very fast as it has been observed to at the rate of, from six to twelve inches per twenty-four hours. It makes a burrow completely through the cane from top to bottom, destroying the whole of the soft interior parts.

This beetle occurs in considerable numbers in Trinidad, but so far has not been before observed attacking the sugar cane. If a Palm is wounded it makes its appearance in a few hours, both the sexes of the insect being about equally represented. The destruction of the tree follows rapidly, tall Palms sixty to eighty feet in height being killed out in a month or six weeks.

It is quite probable, however, that the occurrence of this beetle in the cane is a chance one, and that the attack is little likely to become common, but it should be remembered however that it is obviously possible, that wanting other food, the insect may become a pest in the cane fields. As a precautionary measure in our own case, and as practice for the cadets, they have been instructed to wound several of our Gru-gru trees for the purpose of attracting the insects and keeping them away from our cane fields.

It is the larvae of this insect which properly cooked, forms one of the special dishes of Trinidad, but is nevertheless not desired in the cane fields.

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TEN THOUSAND ACRES SUGAR BEETS.

The Loveland beet sugar factory management has already contracted for 2,000 acres from Weld county farmers for beet culture this year, the beets to be loaded on the car at from $4.50 to $5 per ton, according to the saccharine test of the beets themselves, the saccharine product running as high as 21 per cent., while the beets will have an average production of 15 tons per acre. This insures a Weld county distribution from the Loveland factory this year of at least $120,000. It is said that the factory contracts in Larimer and Bould counties will aggregate 8,000 acres, thus giving the Loveland sugar industry, all told, 10,000 acres of beets for its first year's operation. This means an actual money expenditure of at least $500,000 for beets alone, based on already operating Colorado beet sugar factories, with a production of sugar this year of 15,000,000 pounds. The Loveland factory expects to begin operations by September 1. It looks as if the prolific sugar beet is to rival in Weld county the great Greely potatoes and the fatted lamb.—Lehi (Utah) Banner.

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How greatly the British Government profits by death can be judged by the returns of the estate duties for 1899-1900, just issued. They show that nearly £14,000,000 ($70,000,000) were added to the exchequer from this cause. The total amount bequeathed by 65,341 persons was more than £292,000,000 ($1,460,000,000), or half the National debt. Twelve millionaires paid tolls to the amount of £2,000,000 ($10,000,000).

AMERICA AND THE WEST INDIES.

Sir Nevile Lubbock writes as follows on "America and the West Indies:"

The condition of the West Indies four years ago was so precarious that Mr. Chamberlain felt it his duty to make urgent representations on the matter to Her Majesty's Government. As Secretary of State for the Colonies he was not prepared to accept the responsibility of allowing things to take their course, or to acquiesce in the policy of non-intervention hitherto pursued in regard to bounties, without having satisfied himself as to what such a policy might involve, both as regards the Colonies and the Exchequer. Nor did he consider that Ministers should adhere to their attitude on the Bounty question without knowing, as clearly as possible, the probable cost to the welfare and stability of such an important part of the Empire, and to industries in which English capital is largely invested. As a result of these representation a Royal Commission was appointed to suggest such measures as appeared best calculated to restore and maintain the prosperity of these Colonies and their inhabitants, the Commissioners being Sir Henry Norman, Sir Edward Grey and Sir David Barbour, than whom it would have been difficult to find men better qualified for their task or more likely to command general confidence. In due time their report was presented, when the opinion was expressed—that the sugar industry in the West Indies is in danger of practical extinction; that no industry or series of industries can in the space of a few years supply its place; and that some of the colonies will for a time be unable to meet the necessary and unavoidable cost of administration, including payment on account of public debt. It was unanimously agreed that the best remedy for this unfortunate state of affairs would be the abandonment of the Bounty system practiced by continental nations, but while Sir Henry Norman boldly recommended the imposition of countervailing duties Sir Edward Grey and Sir David Barbour hesitated to advise the Government to bring about the desired end by this means.

Other proposals were made with the object of developing the minor industries of the West Indies, more especially that of fruit cultivation, which, in the case of Jamaica, has become

an important product, and Mr. Chamberlain has taken steps to carry out many of the suggestions put forward, although sufficient time has not yet elapsed for those measures to have any appreciable effect.

Meanwhile two things are manifest—the Commissioners' forecast has not been verified, and the economical crisis has passed away. Seeing the nature of the Imperial interests involved, it may be interesting to examine how this unexpected change has come about; and whether the present moderate degree of prosperity, or perhaps I should say, absence of immediate danger, is likely to last. In addition to the progress of the fruit trade in Jamaica, the production of cocoa is gradually increasing in Trinidad and Grenada, and I may say in some of the other islands, notably St. Lucia and Dominica, while the asphalt lake in Trinidad yields an annual revenue to that colony of some £40,000. No change, however, has manifested itself in the condition under which these industries are carried on. They are not hampered by any artificial impediment, and there is no reason to anticipate any setback to their progress. They have prospered and will continue to prosper, but their progress is normal, and no marked sign of any special activity is visible. On the other hand, sugar, still the largest industry in the West Indies, and in some of the colonies practically the only industry, has been during the last three years far more profitable than before, and it is mainly due to this cause that the crisis has, for the present, been averted.

Out of a total known production of the world of 9,000,000 tons of sugar about 6,500,000 are produced either under an effective system of protection or with the aid of bounties. Of this quantity, speaking roughly, 6,000,000 tons receive bounties ranging in amount from £1 5s. to £5 per ton, and the remaining 500,000 tons have the advantage in the United States of being protected with a duty equal to some £7 per ton. The cost of production, which varies in different places and according to seasons, may be put in round figures at £9 to £10 per ton.

To those acquainted with the conditions under which competing industries are carried on today, it is well known that almost an inappreciable difference in the price paid by the consumer means prosperity or ruin to the producer. In the

case of sugar, the difference in the price, if bounties were abolished, would amount to about one-eighth of a penny per pound, but this represents fully 10 per cent. on the cost of production, and Manchester has told us in the most emphatic terms that a handicap of this amount in competition with India would ruin her cotton industry. With these facts before us, it appears extraordinary that Sir Edward Grey, and Sir David Barbour with his large experience, should fail to see how heavily these bounties weighed upon the sugar industry of the West Indies.

Since their report was issued we have had an object lesson which goes far to show how wrong was their view. In 1896, only two large markets, Great Britain and the United States, were nominally open to West India sugar, and in both these countries bounty-fed sugar was admitted on the same terms as West India sugar. A year later, the duties on sugar in the United States were largely increased, and concurrently with this increase countervailing duties equivalent to the bounties were imposed. In anticipation of these fiscal changes, American merchants imported sugar in large quantities, and before the extra duties came into force they had accumulated a reserve of some six hundred thousand tons. With this enormous supply, the American markets were independent of further importations for some five months succeeding the date of the imposition of countervailing duties, which accordingly had no effect until the end of 1897. In the following year, however, the West Indies began to feel the benefit, and from that time the West India sugar trade has shown signs of improvements.

The revival in the economic condition of the West Indies is due, therefore, solely to the action of the American government in countervailing bounty-fed sugar, and for the first time giving to West Indian sugar producers a fair field for competition with their European rivals in the markets of the United States. But it is only in the colonies possessing the advantage of modern machinery, such as British Guiana, Trinidad and St. Lucia, that sugar has been really doing well. In Barbadoes, St. Kitts, Nevis and Antigua, the sugar industry has done little more than hold its own, although in some cases proprietors have made good profits.

Central factories are urgently needed in these islands; but

while the English market is under the influence of bounties, private capital for this purpose will not be forthcoming. There is reason, however, to believe that the question is receiving due consideration at the Colonial Office. But if the critical condition of affairs in the West Indies, to which Sir Henry Norman, Sir Edward Grey and Sir David Barbour called attention four years ago, has passed away, a similar state of things may occur again should the United States decide at any time to abandon countervailing duties.

I submit it is a most unsatisfactory position for any British colony to be in, to know that the prospects of its leading industry depend upon the goodwill of a foreign country, and this because the mother-land—the mother of free trade—refuses free trade to her own children. Nor is the case improved by the knowledge that Britain obtains sugar at one-eighth of a penny per pound cheaper than would be the case if she were just to her colonies and adhered to the true principles of free trade.

Even assuming that the United States continue their countervailing duties, still another danger is to be feared. America may obtain the whole of her sugar supply from her own territories, and if Cuba be annexed, that time may not be so very far distant. Hence the urgent necessity of the British government facing the fact that the position of our West Indian Colonies cannot be regarded as secure until bounties are done away with. The views of the whole Empire on this matter were plainly expressed at the Congress of the Chambers of Commerce held in London last year, when some five hundred representatives of different chambers were present.

A resolution, calling upon the Government to put an end to the bounty system, was proposed, and after a full discussion adopted almost unanimously. The inconsistent attitude which successive administrations have adopted must be finally abandoned. It is absurd to negotiate, as we have done for the last thirty years, for the abolition of bounties, and at the same time to argue that bounties are a benefit to us. As I have already said, consumers in this country may benefit to the extent of half a farthing on a pound of sugar, but this paltry saving is gained at the expense of our sugar refining and engineering trades, and imperils the sugar industry of Great Britain, which should not, I maintain, be sacrificed

because the colonies cannot influence votes. Recent advices from the Continent point to a general wish on the part of the bounty-giving Powers practically to abandon the system, but to bring about a convention, having for its object this very desirable result. England must of necessity be a party to it.

The sole object of bounties, at the present moment, is to obtain access to the English market, and the competition between the bounty-giving countries is so acute that no single power can venture to abandon bounties unless all the Powers do the same. For example, if Germany and Austria were to do away with bounties, and England were to admit French bounty-fed sugar without countervailing the bounty, French sugar would soon entirely supplant that of Germany and Austria.

The end can only be obtained by England undertaking to secure equal conditions of competition for all the Powers concerned. It is not to be supposed that the European sugar proprietors will favor the abandonment of a system that has put so much public money into their private pockets, but it has become obvious that the Government desires to make a change in this portion of their fiscal policy and would welcome a firm attitude on the part of the British Cabinet. We shall shortly be invited to another European conference, and there is good reason for believing that the bounty-giving Powers are hoping our delegates may be empowered to fall in with their views, and to provide them with a fair and equal chance of competition in the English market. By this means bounties may be abolished without the imposition of countervailing duties. But unless British Ministers mean business and are prepared to help the European Powers out of what is a difficulty to them and an injury to us, the approaching conference will be as futile as all the others have proved. It is Britain, and Britain alone, that stops the way.

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Tomatoes, picked when just beginning to redden, wrapped separately in tissue paper and placed in a crate packed on the bottom and top with excelsior, were kept in cold storage about two months. Green tomatoes may be held in storage for several months, but when removed, instead of ripening, they simply rot.

THE VALUE OF SUGAR AS A FOOD.

A day or so ago The Post mentioned the great possibilities in a productive way of this section of Texas as a sugar belt. It may be interesting to note in the same connection the very recent high testimonial, by an eminent medical authority, to the virtues of sugar as a food.

It used to be a theory that a sugar diet, or too much "sweeten'," was really injurious to digestion and health. Dr. Willoughby Gardner, in a late issue of the British Medical Journal, does not subscribe to this proposition, but regards sugar as one of the most useful foods man can enjoy. After first showing that many injurious qualities formerly ascribed to sugar have no existence, he continues:

It is easily digested and absorbed; it is readily stored up as glycogen, forming a reserve of force-producing material; it is in this form readily available when required; it becomes completely oxidized without any waste and leaves no residue. That it creates energy and maintains strength has been proven by laboratory experiments and by the experience of mountain climbers, of explorers and athletes, and of German soldiers who have been kept on a diet containing a great deal of sugar. It is shown also by the fine condition of the date-eating Arabs and of the negroes who eat sugar cane.

From these facts Dr. Gardner concludes that the increased height and weight and the improved health of the English people in the last half century are due largely to the increased consumption of sugar. The inference is plain that an important factor in Anglo-Saxon superiority, in the greater energy and push of the race, is the habit of eating more sugar than other nations do.

Manifestly the thing for the sugar producing sections to do is to scatter broadcast such scientific information as this. While the per capita consumption is rapidly increasing in this country and abroad, yet the world could consume still greater quantities of sugar, and would do so, doubtless, in the full virtue of sugar as a nutritious and strength-giving food were more generally appreciated.—Texas Paper.

THE APPLE CROP.

That the apple crop is actually worth more in cash, annually, than the wheat crop is a fact. The entire apple crop for 1900 was 215 millions of barrels. These, at two dollars per barrel, would mean 430 millions of dollars. The wheat crop does not average in value much over three hundred millions. The meaning of this is that we have got the world's market for our fruit; and are exporting nearly four millions of barrels per year. These bring in the European markets nearer four dollars a barrel than two dollars. And still the export trade is increasing every year. American fruit has a known worth from St. Petersburg to Liverpool. We have still to estimate the relative value of wheat and fruit as food. There is a growing conviction that we have used too little fruit with our daily diet. A city family, with a meat bill running to the hundreds of dollars, and a pastry and bread bill of half that amount, will get on with two or three barrels of apples per year. This habit, however, is rapidly changing. We are growing frugivorous and less carnivorous. It is said that the show of apples made by the United States at the Exposition at Paris has increased the trade enormously.

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"The open-door policy is," says a writer, "far more welcome to Russia now than the 'Sphere of Influence,' which would mean her exclusion from parts of Asia. Once Russia has brought the people of China under her sway, she will have a standing army greater than all the other combined forces of the world, and with but one vast cohesive country, without a single detached colony to defend. This is the stake Russia is playing for. Confident that the Anglo-Saxon race has seen the apex of its glory, the Slav believes he is to rise to the position of world-power with the twentieth century. He admits but one rival, the nation whose friendship he has courted from its inception—America."

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A nation cannot live alone and prosper. The United States is today in a position with new responsibilities and new dangers. To adopt a foreign statement, the peace which closed the Spanish-American War marked a new epoch, not only for the United States, but for the whole world.

HONOLULU STOCK AND BOND EXCHANGE, AUGUST 20, 1901.

STOCK	Capital Authorized	Shares Issued	Capital Paid up	Par Value	Last Sale
MERCANTILE					
C. Brewer & Co	$ 1,000,000	10,000	$ 1,000,000	$ 100	415
N. S. Sachs' Dry G'ds Co. L'd.	60,000	600	.....	100	100
L. B. Kerr & Co, Ltd	200,000	4,000	.....	50	.....
SUGAR					
Ewa Plantation Company	5,000,000	250,000	5,000,000	20	24½
Hamoa Plantation Company	175,000	1,750	175,000	100	.....
Hawaiian Agricultural Co	1,000,000	10,000	1,000,000	100	275
Hawaiian Com'l & Sugar Co.	10,000,000	100,000	2,312,750	100	80
Hawaiian Sugar Company	2,000,000	100,000	2,000,000	20	30
Honomu Sugar Company	750,000	7,500	750,000	100	172½
Honokaa Sugar Company	2,000,000	100,000	2,000,000	20	33¼
Haiku Sugar Company	500,000	5,000	500,000	100	.....
Kahuku Plantation Company	500,000	25,000	500,000	20	22¼
Kihei Plant. Co. Ltd,	2,500,000	50,000	2,500,000	50	11
Kipahulu Sugar Company	160,000	1,600	160,000	100	.....
Koloa Sugar Company	300,000	3,000	300,000	100	150
Kona Sugar Company	500,000	5,000	500,000	100	.....
McBryde Sug. Co. L'd. Assess	1,850,000	.....	1,036,000	20	8
McBryde Sug. Co. Ltd. Pd up	1,650,000	.....	1,650,000	20	10½
Nahiku Sug. Co. Ltd. Assess.	675,000	33 750	.....	20	.....
Nahiku Sug. Co. Ltd. Pd. up	75,000	3,750	.....	20	.....
Oahu Sugar Co	3,600,000	36,000	3,600,000	100	130
Onomea Sugar Co	1,000,000	50,000	1,000,000	20	30
Ookala Sugar Plantation Co.	500,000	25,000	500,000	20	13
Olaa Sugar Co. Ltd., Assess.	2,500,000	125,000	865,000	20	3
Olaa Sugar Co. Ltd., Paid up	2,500,000	125,000	2,500,000	20	13
Olowalu Company	150,000	1,500	150,000	100	.....
Paauhau Sug. Plantation Co.	5,000,000	100,000	5,000,000	50	.....
Pacific Sugar Mill	500,000	5,000	500,000	100	.....
Paia Plantation Company	750,000	7,500	750,000	100	250
Pepeekeo Sugar Company	750,000	7,500	750,000	100	.....
Pioneer Mill Company	2,250,000	22,500	2,250,000	100	90
Pioneer Mill Company Ass.	500.000	5,000	125,000	100	.....
Waialua Agricultural Co	4,500,000	45,000	4,500,000	100	80
Wailuku Sugar Company	700,000	7,000	700,000	100	370
Waimanalo Sugar Company	250,000	250,000	250,000	100	150
Waimea Mill Company	125,000	125,000	125,000	100	87
MISCELLANEOUS					
Wilder Steamship Company	500,000	5,000	500,000	100	100
Inter-Island Steam Nav. Co.	600,000	6,000	600,000	100	100
Hawaiian Electric Company.	300,000	3,000	300,000	100	110
Honolulu R. T. & Land Co	250,000	2,500	250,000	100	.....
Mutual Telephone Company	150,000	13,900	139,000	10	9
Oahu Railway & Land Co	4,000,000	40,000	4,000,000	100	105
People's Ice & Refrig. Co.	150,000	1,500	150,000	100	85
BANKS					
First National Bank	500,000	5,000	500,000	100	.....
First Am. Sav. B. & Trust Co.	250,000	2,500	250,000	100	.....
BONDS	Amt. of Issue				
Hawaiian Govt. 5 per cent.	1,251,200	Dec. 31, 1900	.....	.....	96
Hilo Railroad Co., 6 per cent	450,000	.....	.....	.....	100
Hilo R. R. Co., 6 per cent	150.000	.....	.....	.....	.....
Hono. R. T. & L. Co, 6 p. c.	300,000	.....	.....	.....	.....
Ewa Plantation 6 per cent.	500,000	.....	.....	.....	100
Oahu Railway & L'd Co 6 p. c	2,000,000	.....	.....	.....	104½
Oahu Plantation 6 per cent.	750,000	.....	.....	.....	.....
Olaa Plantation 6 per cent	1,250 000	.....	.....	.....	.....
Waialua Agr. 6 per cent.	1,000.000	.....	.....	.....	102¼